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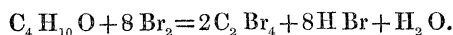
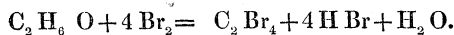
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being 158° and 160° ; residual measures with the metal coating 2.5 measures, or about the $\frac{1}{40}$ th of the total charge; with paper coating, in some experiments 80 measures, or about $\frac{8}{10}$ ths of the total charge, so that the residual charges with metal and paper are as 1 : 32. Thermo-electric effect for metal coating 8° , for paper coating nothing. It appears from these and similar experiments, that the interposition of imperfect conductors between the coating and the glass of the Leyden jar must necessarily impair its efficiency, and change its electrical indications, especially when of any considerable thickness. Three turns of common linen interposed between the outer coating and the glass reduced the force of discharge from 11° to 6° , nearly one-half, whilst the residuary or retention of charge is considerably increased: this question, as bearing in some degree on the retention of charge by the electric cable, may not be undeserving of further investigation.

IV. "On the Bromide of Carbon." By ARTHUR C. W. LENNOX, Esq. Communicated by Dr. HOFMANN. Received May 24, 1861.

The compounds of carbon with bromine have as yet received but limited attention. The tetrabromide of carbon, CBr_4 , of the methyl-series is altogether unknown. Kolbe failed in obtaining this compound by submitting disulphide of carbon at a high temperature to the action of bromine, and I learn from Dr. Hofmann that the action of pentabromide of antimony on the disulphide gives no better result.

The bromide of carbon, C_2Br_4 , has been obtained by Löwig*, who procured this substance by the action of bromine on alcohol or on ether, when it is formed according to the equations—



These processes appear, however, to be attended with difficulties; at all events, Völckel†, who repeated Löwig's experiments, failed in obtaining the substance described by that chemist.

A simpler method for obtaining this bromide of carbon appeared to present itself in the perfect substitution of bromine for the hydrogen in olefiant gas.

* *Annalen der Chemie und Pharmacie*, iii. 292.

† *Ibid.* xli. 119.

The brominated derivatives of ethylene have been chiefly examined by Regnault and by Cahours, and more recently by Wurtz and by Sawitch.

The following terms have been obtained :—

Dibromide of Ethylene. $C_2 H_4 Br_2$.	Monobrominated Ethylene. $C_2 H_3 Br$.
Dibromide of Monobrominated Ethylene. $C_2 (H_3 Br) Br_2$.	Dibrominated Ethylene. $C_2 H_2 Br_2$.
Dibromide of Dibrominated Ethylene. $C_2 (H_2 Br_2) Br_2$.	Tribrominated Ethylene. $C_2 H Br_3$.
Dibromide of Tribrominated Ethylene. $C_2 (H Br_3) Br_2$.	

It thus appears that the whole series has been obtained with the exception of the tetrabrominated ethylene and its corresponding dibromide, the former of which would be the bromide of carbon obtained by Löwig in the reactions above indicated. Of the brominated derivatives of ethylene, dibromide of ethylene, monobrominated ethylene (bromide of vinyl) and dibromide of monobrominated ethylene, have as yet been best investigated. In re-examining these substances, in transforming dibromide of ethylene by the action of an alcoholic solution of potash into monobrominated ethylene, and the latter by treatment with bromine into the corresponding dibromide, I had an opportunity of tracing step by step the observations of my predecessors.

Dibrominated Ethylene.

The action of an alcoholic solution of potash upon the dibromide of monobrominated ethylene yields, together with secondary products, a comparatively small quantity of the oily compound $C_2 H_2 Br_2$, which is still further diminished by the extraordinary property exhibited by this substance of undergoing a molecular transformation similar to that of dichlorinated ethylene as observed by Regnault*, and of monobrominated ethylene more recently examined by Dr. Hofmann†. Dibrominated ethylene having been lately the subject of a minute investigation by M. Sawitch‡, I have not entered upon a more

* Annales de Chimie et de Physique, [2] vol. lxix. p. 151.

† Quarterly Journal of the Chemical Society, xiii. 68.

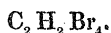
‡ Bulletin de la Société Chimique de Paris, 1860.

close examination of this body, but have at once, by the renewed action of bromine, converted it into the

Dibromide of Dibrominated Ethylene.

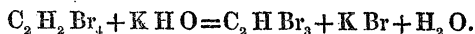
Bromine attacks the dibrominated ethylene with the greatest energy; heat is evolved, and the bromine disappears. When the bromine was no longer fixed, the orange-yellow liquid thus produced was treated with a weak solution of potash, washed with water, and ultimately distilled with precaution. It boils at about $200^{\circ}\text{C}.$, but not without partial decomposition; white fumes containing hydrobromic acid being given off during ebullition, which powerfully and persistently attack the eyes.

The bromine-compound is insoluble in water, but dissolves readily in alcohol and in ether. When exposed to a freezing mixture, it solidifies to a white crystalline mass. It was found impossible to purify this substance for analysis by distillation; a current of perfectly dry carbonic acid gas was therefore passed through the liquid heated in a water bath to about 75° . After a time it assumed a lighter colour, and no longer gave off hydrobromic acid; it was then found to contain



Tribrominated Ethylene.

The dibromide previously described is powerfully acted upon by an alcoholic solution of potash,



Addition of water to the alcoholic solution precipitates the tribrominated ethylene as an oily substance boiling at $130^{\circ}\text{C}.$, which by digestion with chloride of calcium and subsequent careful distillation, may be obtained sufficiently pure for analysis.

The results obtained in the analysis of this compound prove it to be represented by the formula



Tribrominated ethylene, like the other substitution-products of ethylene, is apt to furnish an isomeric solid, readily soluble in alcohol and in ether, from which it crystallizes in colourless plates. On slowly evaporating a solution of the oily modification in alcohol or ether, the crystalline solid is likewise obtained.

Dibromide of Tribrominated Ethylene.

To obtain this compound, tribrominated ethylene was introduced into a retort, and cautiously distilled into a receiver containing bromine. Combination took place with considerable evolution of heat. The orange-red liquid thus produced was washed with weak potash, and ultimately with water. Thus purified, this bromine-compound is a yellowish red oil, soluble in alcohol and in ether, and solidifying when exposed to a frigorific mixture. I have not succeeded in preparing this substance in a state of sufficient purity for analysis. But the nature of this body is clearly established by the facility with which it is transformed into

Tetrabrominated Ethylene or Bromide of Carbon,

by the action of an alcoholic solution of potash.

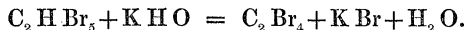
Addition of water to the alcoholic solution precipitates this compound as an oily liquid, which, when slowly deposited by spontaneous evaporation from its solution in alcohol or ether, separates in beautiful crystalline plates of an agreeable aromatic odour and burning taste. One or two recrystallizations render this substance perfectly pure. It is heavier than water, fuses at $50^{\circ}\text{C}.$, sublimes at a higher temperature, and is not attacked by the mineral acids.

These properties identify this compound with the bromide of carbon obtained by Löwig in the action of bromine upon alcohol and upon ether.

For analysis, the substance was dried over sulphuric acid *in vacuo*; the formula



was established by the determination both of carbon and of bromine. The tetrabrominated ethylene is generated by the action of an alcoholic solution of potash upon the dibromide of tribrominated ethylene, according to the following equation:—



The experiments which form the subject of this note were performed in the laboratory of Dr. Hofmann.